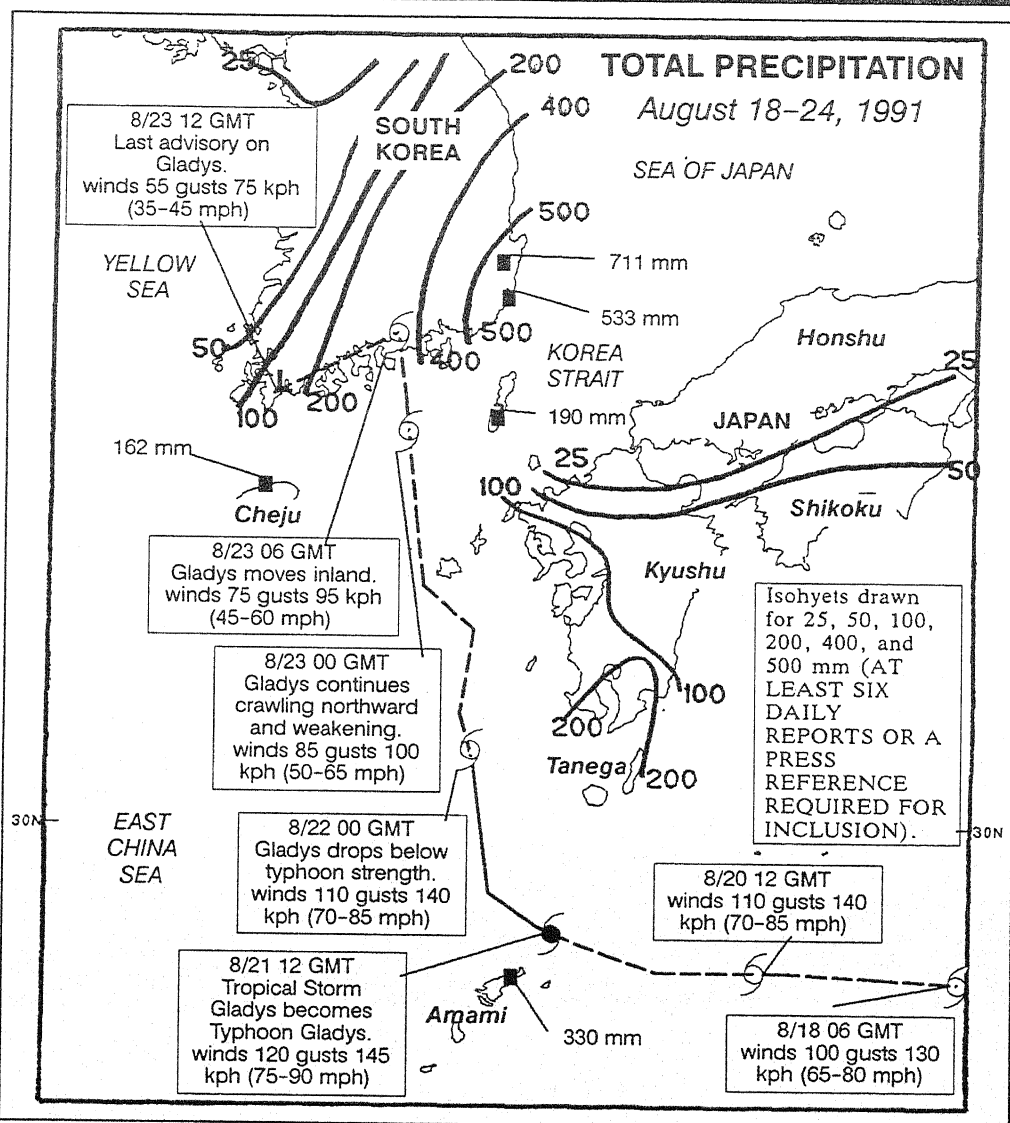


WEEKLY CLIMATE BULLETIN

No. 91/34

Washington, DC

August 24, 1991



Minimal Typhoon Gladys drifted northward across the northern Ryukyu Islands, skirted the western coast of Japan's Kyushu Island, and moved northward into the southern South Korea coast before turning westward and dissipating. The storm generated a broad onshore flow of tropical air along the southern Japanese coast and through southern and eastern South Korea, enhancing rainfall totals in those areas. Huge amounts of rain (up to 711 mm in Kyongju, located 280 km southeast of Seoul) inundated southeastern South Korea while Pusan and nearby Ulsan measured up to 410 mm on Friday, the largest 24-hour total measured in the 31-year history of the observatory. According to press reports, over 5 dozen individuals lost their lives and 6700 houses were flooded, leaving at least 11,000 people homeless. Property damage was estimated at \$62 million. Farther east, up to 225 mm of rain associated with the fringes of the Typhoon generated landslides near Tokyo, taking at least 10 lives.



UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER



WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

STAFF

Editor	Tom Heddinghaus
Associate Editor	Richard Tinker
Contributors	Joe Harrison
	Paul Sabol
	David C. Stutzer
Graphics	Robert H. Churchill
	Alan Herman

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF AUGUST 24, 1991

1. Northeast United States:

HURRICANE BOB STRIKES REGION:

Early in the week, Hurricane Bob (see Weekly Climate Bulletin # 11/33, dated August 17, 1991) strengthened as it moved northward parallel to the mid-Atlantic coast, drenching North Carolina's outer banks with over five inches of rain. The storm then raced rapidly northeastward, slamming into New England with winds gusting to 15 mph and torrential rains of up to seven inches. Massachusetts estimated \$69 million in damage to public property, \$10 million to farmland, and \$90 million to homes, boats, businesses and other private property. Other state governments' estimates of public property damage ranged from \$9 million in Rhode Island to \$1.1 million in New Hampshire. Bob ranks second behind Hurricane Hugo in terms of total damage caused by a hurricane in the United States [Episodic Event].

2. Eastern and Central United States:

RAINS BRING RELIEF IN THE EAST, BUT DRYNESS PREVAILS ELSEWHERE.

Showers and thunderstorms soaked much of Pennsylvania and western Maryland with over 50 mm of rain, easing recent dryness. Thunderstorms also brought scattered amounts of 25 to 50 mm to the eastern Corn Belt, but the Ohio Valley, Tennessee Valley, and northern portions of Mississippi and Alabama remained extremely dry. Most locations have received 50-130 mm less than normal rainfall since mid-July [13 weeks].

3. Southern Plains and Central High Plains:

A DRY WEEK EASES WETNESS.

Little or no rainfall was reported across most of the central and southern High Plains, providing relief from the spotty flash flooding that had plagued much of the area since the onset of the monsoon. Scattered amounts above 50 mm, however, kept portions of central and eastern Texas wet, causing minor to moderate river flooding [Ending after 8 weeks].

4. Northern Senegal and Southwestern Mauritania:

DRYNESS PERSISTS.

Senegal and southwestern Mauritania reported spotty totals of 10-60 mm as six-week deficiencies of 50-150 mm continued across the region [10 weeks].

5. Southeastern Europe:

DRIER WEATHER PREVAILS.

Little or no rain fell over much of the area last week, decreasing

moisture surpluses. Only widely scattered amounts of over 4 mm were measured in Hungary and Romania [Ending after 12 weeks].

6. Western India and East-Central Pakistan:

MONSOON RAINS RESUME.

Moderate to heavy rains (30-100 mm) soaked portions of central Pakistan, Gujarat, Rajasthan, and the Punjab as monsoon rains returned following dry weather the previous week. Little or no rain, however, fell in other parts of the region [Ending after 12 weeks].

7. Luzon:

MONSOON RAINS TRIGGER MUDSLIDES.

Heavy monsoon rains engendered avalanches of mud, rocks, and volcanic debris through river channels in several towns near Mount Pinatubo. According to press reports, at least 31 people drowned or were buried by mudflows in central Luzon last week. Daily rainfall totals reached 215mm. Unusually heavy rainfall persisted since mid-July, with most of Luzon receiving 130-300 mm more than normal [6 weeks].

8. Japan and South Korea:

TYPHOON GLADYS DRENCHES REGION.

Minimal Typhoon Gladys moved slowly northward through the China Sea and made landfall along the southern South Korea coast while dissipating on Friday. Bands of thunderstorms associated with the large tropical cyclone dumped heavy rain along the southern coast of Japan, causing landslides that took nearly a dozen lives near Tokyo, according to press reports. As the system moved northward, the system slowly disintegrated while depositing huge amounts of rain (300-700 mm) on much of southern South Korea (see front cover) [Episodic Event].

9. Southeastern Soviet Union:

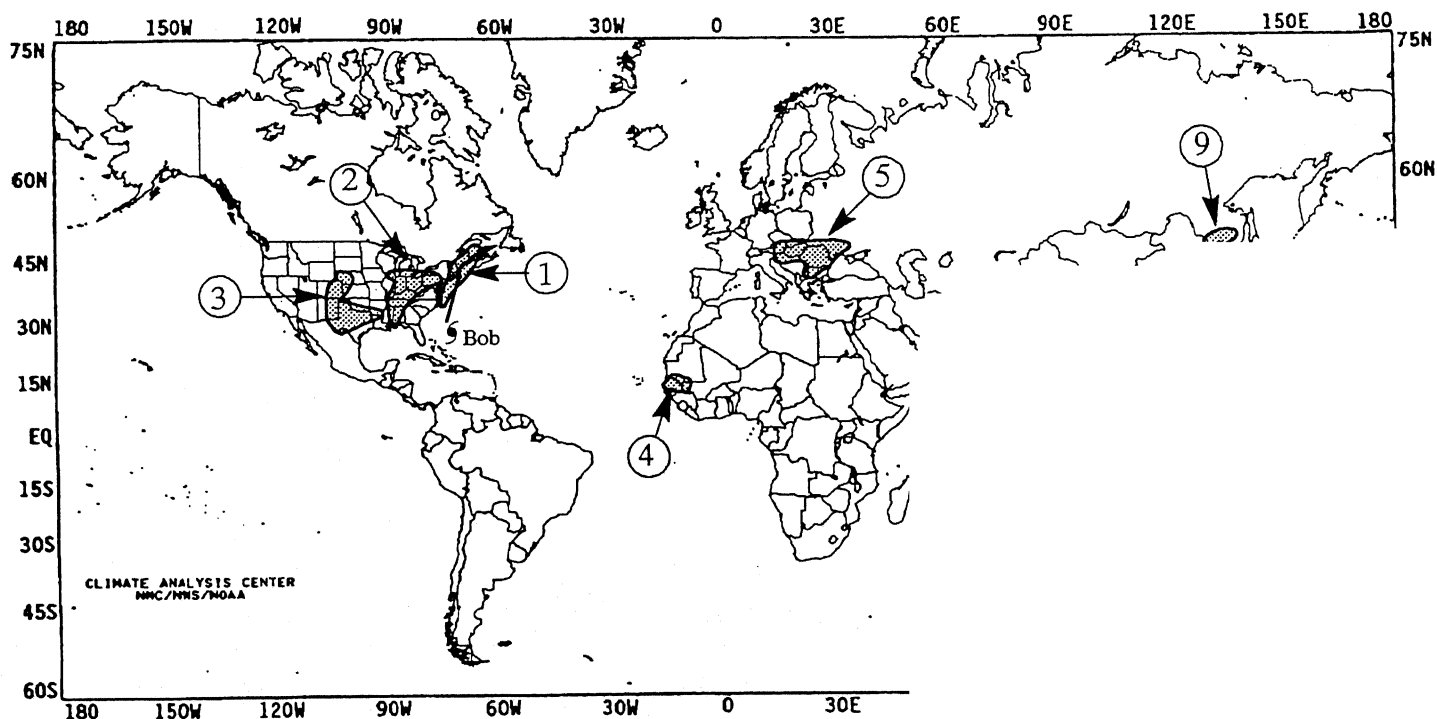
ANOTHER WET WEEK.

Drier weather prevailed across eastern Heilungjiang where significant moisture surpluses decreased. Farther north, however, moderate to heavy rain (20 - 70 mm) persisted in the southeastern part of the Union [12 weeks].

10. South Island, New Zealand:

PROLONGED WET CONDITIONS CONTINUE:

Another week of moderate to heavy rain (30 - 80 mm) kept the western coast of South Island anomalously wet while the northern parts of the country remained somewhat dry (see page 10 for details) [12 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature anomalies, four week precipitation anomalies, long-term anomalies are shown. MAP: Approximate locations of major anomalies and episodic events are shown. S

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF AUGUST 18 – 24, 1991

After grazing the Outer Banks of North Carolina, Hurricane Bob moved rapidly northeastward to New England. Significant damage was reported from New York to Maine. Massachusetts was hardest hit with damage estimates as high as \$1 billion, according to press reports. The hurricane knocked-out electrical service to over 2 million customers in the Northeast after downing numerous trees and power lines. The storm passed directly over Block Island, RI with wind gusts over 100 mph, resulting in damage to several homes. The hurricane then came ashore in eastern Rhode Island and tracked through eastern Massachusetts, leaving behind a trail of destruction. Nearly 200 homes and businesses were flooded in Westerly, RI, while significant damage was reported along coastal Massachusetts and the offshore islands. In Falmouth, MA winds ripped roofs off several homes and buildings, including the Chamber of Commerce. Heavy rains associated with the hurricane drenched southern Maine, causing widespread flooding. Gorham, ME was inundated with over 8 inches of rain which flooded numerous roads and washed out as many as 5 bridges. The hurricane was eventually downgraded to a tropical storm as it moved through Maine and into northeastern Canada. Elsewhere, brief and intense rains deluged parts of the southern Plains and Great Basin. Up to 2 inches of rain in 30 minutes flooded several roads in Baird, TX. Meanwhile, unseasonably cool weather settled into parts of the Mississippi Valley and deep South with nearly a dozen record daily lows reported from Missouri to South Carolina as readings dipped into the fifties. In eastern and central Alaska, autumn-like conditions prevailed as lows dropped into the twenties while frost coated the Tanana Valley.

The week began with Hurricane Bob located off the North Carolina coast and a stalled cold front in the eastern U.S. Strong thunderstorms developed along the front generating wind gusts to 60 mph across parts of western New England, downing trees and power lines in eastern New York. Meanwhile, Hurricane Bob spawned severe thunderstorms in eastern North Carolina. Some storms produced tornadoes near Jacksonville and Penderlea, NC on Sunday. The hurricane raced northeastward paralleling the Atlantic Coast and passing to the east of Hatteras, NC, generating winds up to 70 mph and over 5 inches of rain. The strong winds damaged a fish factory, ripping the front and part of the roof from the building. The storm moved rapidly to the New England coast, causing only minor flooding along the shores of the mid-Atlantic as it passed. However, much of coastal New England was battered by the brunt of the storm. Rainfall amounts between 4 and 9 inches were measured from New Jersey to southern Maine while wind gusts up to 125 mph pummeled parts of Rhode Island. The hurricane eventually pushed onshore again in southern Maine, dumping heavy rain before being downgraded to tropical storm late Monday and exiting the U.S. early Tuesday morning. To the south, a low developed in the mid-Atlantic states, along the stalled cold front. Strong thunderstorms developed along the front from Maryland to Texas with some spawning tornadoes. One tornado damaged a home near Jacksonville, FL. Behind the frontal system, unusually cool weather settled into parts of the Mississippi Valley and southern U.S. with half a dozen daily record lows observed from Missouri to Alabama.

During the last half of the week, the low in the mid-Atlantic trekked northeastward along the the north Atlantic coast, spreading

heavy rain on areas inundated earlier in the week by Hurricane Bob. The additional rain created localized flooding in some areas. In addition, the rain pushed the total August precipitation at Portland, ME to 14.54 inches, making it the wettest month on record. Meanwhile, cool conditions persisted one more day across parts of the South. Half a dozen daily record lows were established from Mississippi to South Carolina. In sharp contrast, hot weather baked portions of the West, southern Plains, and Florida as readings soared near 100°F, establishing record daily highs from Idaho to Florida. The hot conditions fueled strong thunderstorms, dumping scattered heavy rains from the southern Plains to the Great Basin. Localized flooding was reported in parts of Texas and Utah after brief and heavy rains inundated some locations. Meanwhile, strong wind gusts associated with thunderstorms in southern Arizona on Saturday downed power lines and overturned trailers.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) were measured across most of New England, Florida, extreme southern Great Lakes and scattered locations in the Southeast, lower Mississippi Valley, central and southern Plains, and southern Alaska (Table 1). Light to moderate amounts occurred across the remainder of the Northeast, mid-Atlantic, the eastern half of the Ohio Valley, the Appalachians, the deep South, eastern Texas, most of Oklahoma and Kansas, the upper Midwest, much of the central and southern Rockies, portions of the Southwest, eastern Hawaii, and the southern third of Alaska. Little or no precipitation occurred in the Tennessee Valley, west-central Texas, parts of the middle Mississippi Valley, northern Plains and Rockies, Far West, central and northern Alaska, and the remainder of the Hawaiian Islands.

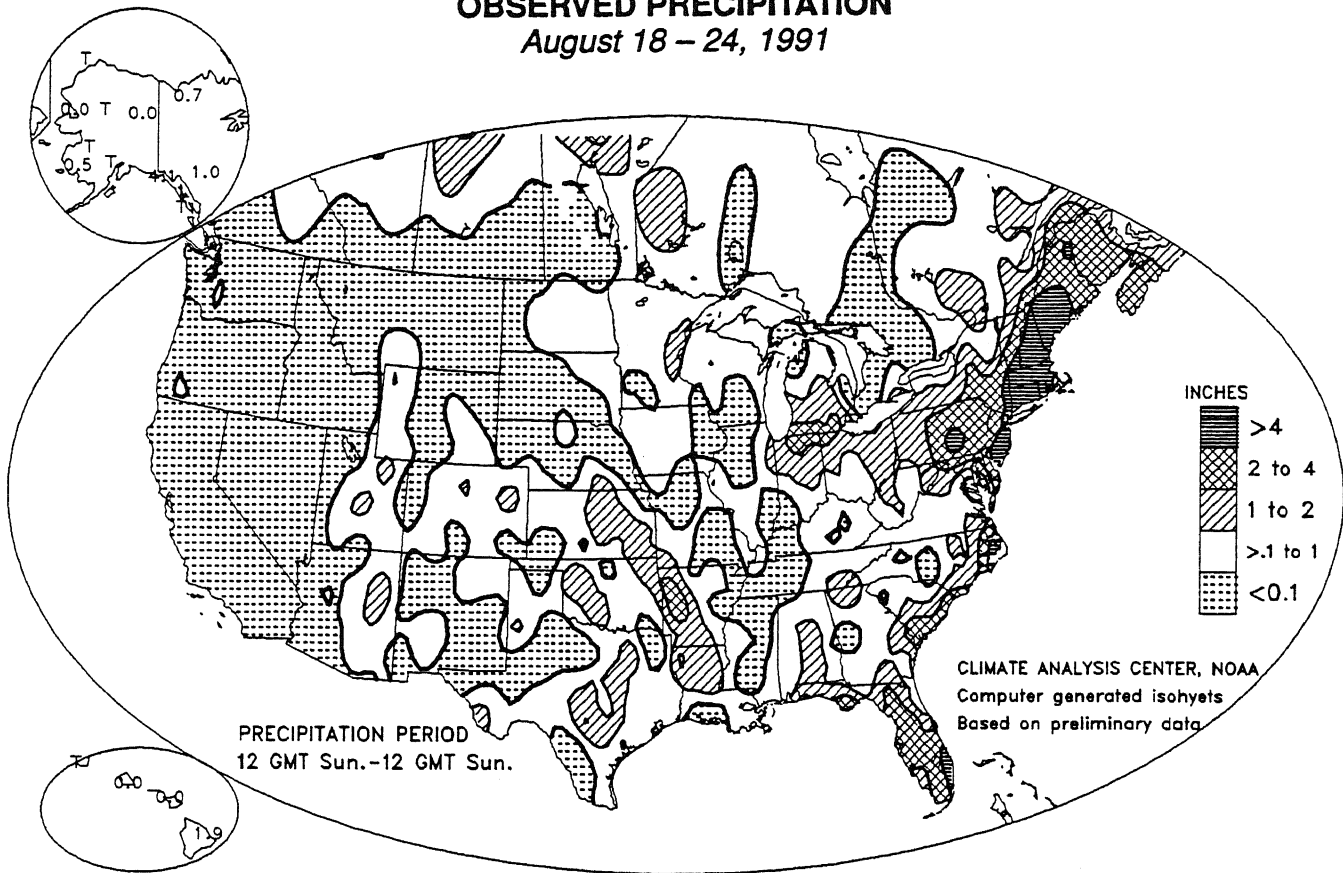
Abnormally warm weather prevailed across most of the western half of the nation (Table 2). Weekly departures between +5°F and +10°F were common from the Southwest to the upper Midwest. Near to slightly above normal temperatures were observed across the southern portions of Texas and Florida, most of New England westward to portions of the Midwest. Weekly departures of +2°F to +4°F were reported in southern Texas and Florida, and extreme southern New England. In Alaska, unusually mild conditions were confined to the southern and western locations with weekly departures up to +3°F recorded at Kotzebue and Unalakleet where highs topped 60°F. Unusually warm weather also affected portions of the Hawaiian Islands with departures to +3°F reported at Molokai.

In contrast, cooler than normal conditions affected the southeastern quarter of the U.S. and extreme northern Great Lakes (Table 3). Weekly departures between -3°F and -5°F were reported in the Tennessee Valley and southern Appalachians where lows dipped into the fifties and also in the upper peninsula of Michigan. Near to slightly below normal temperatures were confined to the remainder of the Great Lakes, the remainder of the Southeast, portions of the upper Midwest, northern and central Texas, coastal southern California and Washington, and northern California. Unseasonably cool weather gripped most of Alaska with weekly departures reaching -5°F at both Fort Yukon and Bettles while slightly below normal temperatures dominated elsewhere.

TABLE 1. SELECTED STATIONS WITH 4.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF AUGUST 18 – 24, 1991

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
PORTLAND, ME	9.57	BRIDGEPORT, CT	5.38
MT. WASHINGTON, NH	8.48	CONCORD, NH	5.21
CAPE HATTERAS, NC	8.24	WEST PALM BEACH, FL	4.95
PORTSMOUTH/PEASE AFB, NH	7.20	TAMPA/MAC DILL AFB, FL	4.57
ISLIP, NY	6.50	POUGHKEEPSIE, NY	4.47
HARTFORD, CT	6.36	LIMESTONE/LORING AFB, ME	4.36
MILLVILLE, NJ	6.23	APALACHICOLA, FL	4.36
NEW YORK/KENNEDY, NY	6.11	BANGOR, ME	4.35
CHICOPEE/WESTOVER AFB, MA	5.71	HOMESTEAD AFB, FL	4.29
WORCESTER, MA	5.63	RUMFORD, ME	4.23
BRUNSWICK NAS, ME	5.48	YAKUTAT, AK	4.10
AUGUSTA, ME	5.43	NEW YORK/LA GUARDIA, NY	4.07

OBSERVED PRECIPITATION August 18 – 24, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F) August 18 – 24, 1991

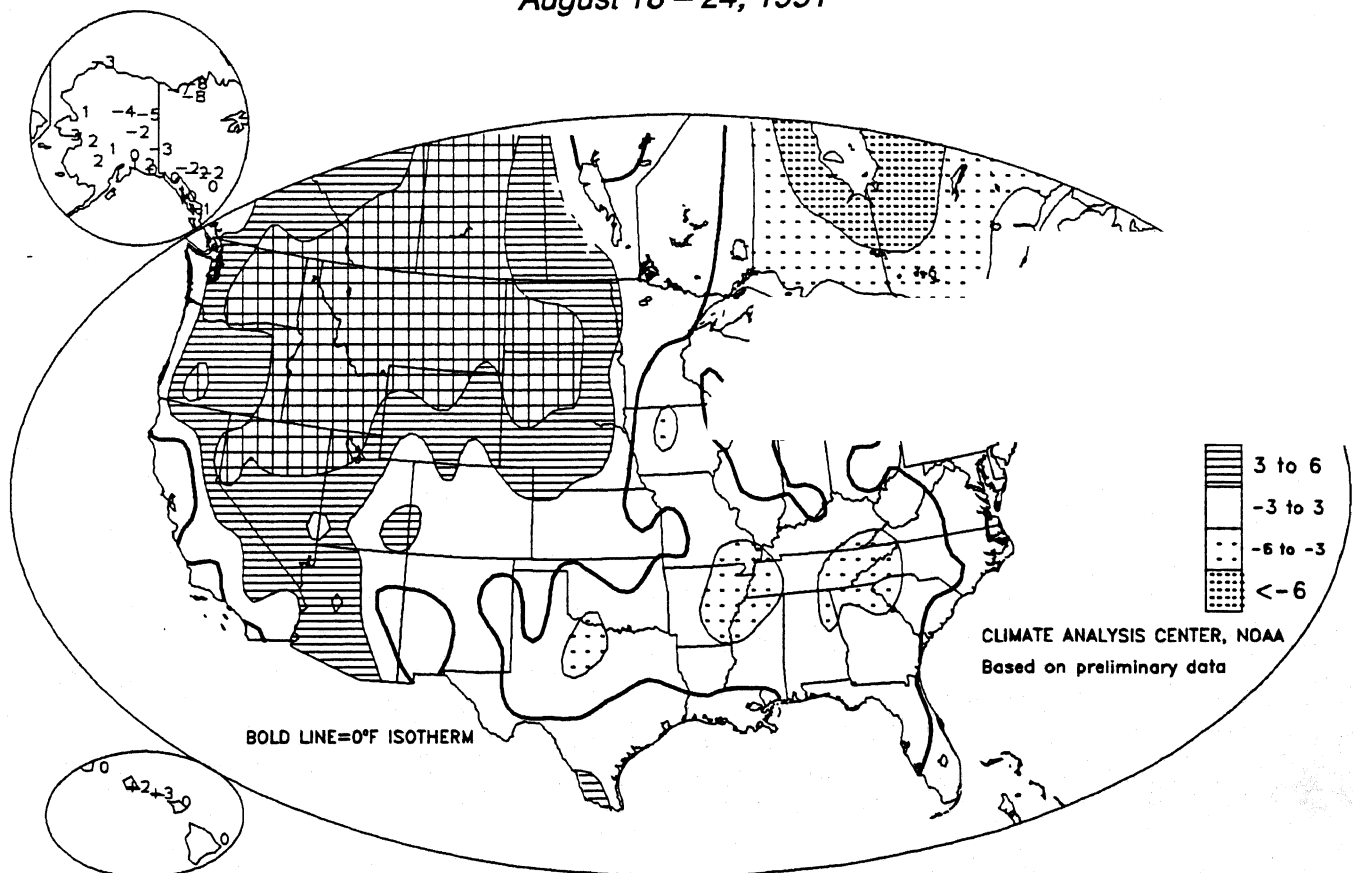


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 7.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF AUGUST 18 – 24, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
HELENA, MT	+9.5	74.5	SHERIDAN, WY	+7.6	75.1
CUT BANK, MT	+9.5	71.0	RENO, NV	+7.6	73.8
BURLEY, ID	+9.1	76.2	BOZEMAN, MT	+7.5	71.3
BILLINGS, MT	+9.0	78.4	RAPID CITY, SD	+7.4	78.0
BOISE, ID	+8.9	79.9	YAKIMA, WA	+7.4	75.2
WALLA WALLA, WA	+8.6	81.8	WORLAND, WY	+7.4	75.1
LEWISTOWN, MT	+8.5	72.2	HAVRE, MT	+7.4	74.7
WENATCHEE, WA	+8.2	79.9	LEWISTON, ID	+7.3	78.8
SPOKANE, WA	+8.2	75.4	BISMARCK, ND	+7.3	75.1
GLASGOW, MT	+7.9	76.1	MILES CITY, MT	+7.0	78.2
GREAT FALLS, MT	+7.9	74.5	WILLISTON, ND	+7.0	74.6

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 3.5°F OR MORE BELOW NORMAL FOR THE WEEK OF AUGUST 18 – 24, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
FORT YUKON, AK	-5.1	48.4	CROSSVILLE, TN	-3.9	68.4
BETTLES, AK	-4.7	49.3	PINE BLUFF, AR	-3.9	77.4
JACKSON, TN	-4.5	74.2	MARQUETTE, MI	-3.7	57.9
BLYTHEVILLE AFB, AR	-4.4	75.4	ANDERSON, SC	-3.7	75.1
BRISTOL, TN	-4.3	69.7	JONESBORO, AR	-3.7	76.1
POPLAR BLUFF, MO	-4.2	74.0	KNOXVILLE, TN	-3.6	73.2
ESCENABA, MI	-4.1	60.2			

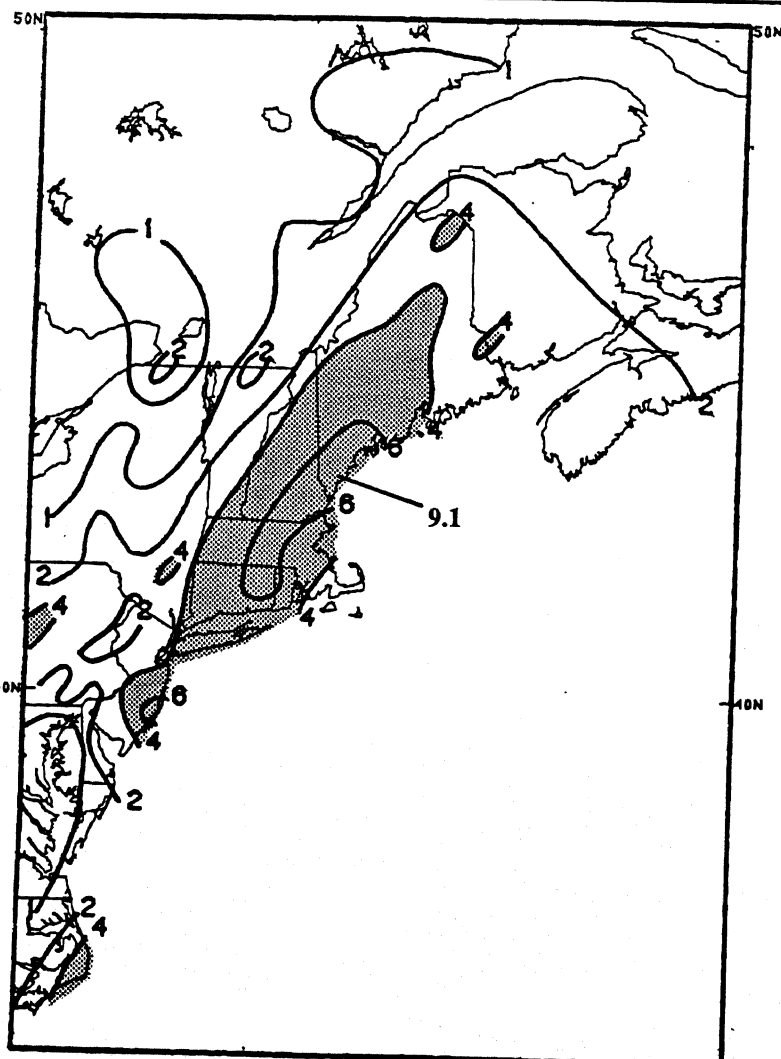
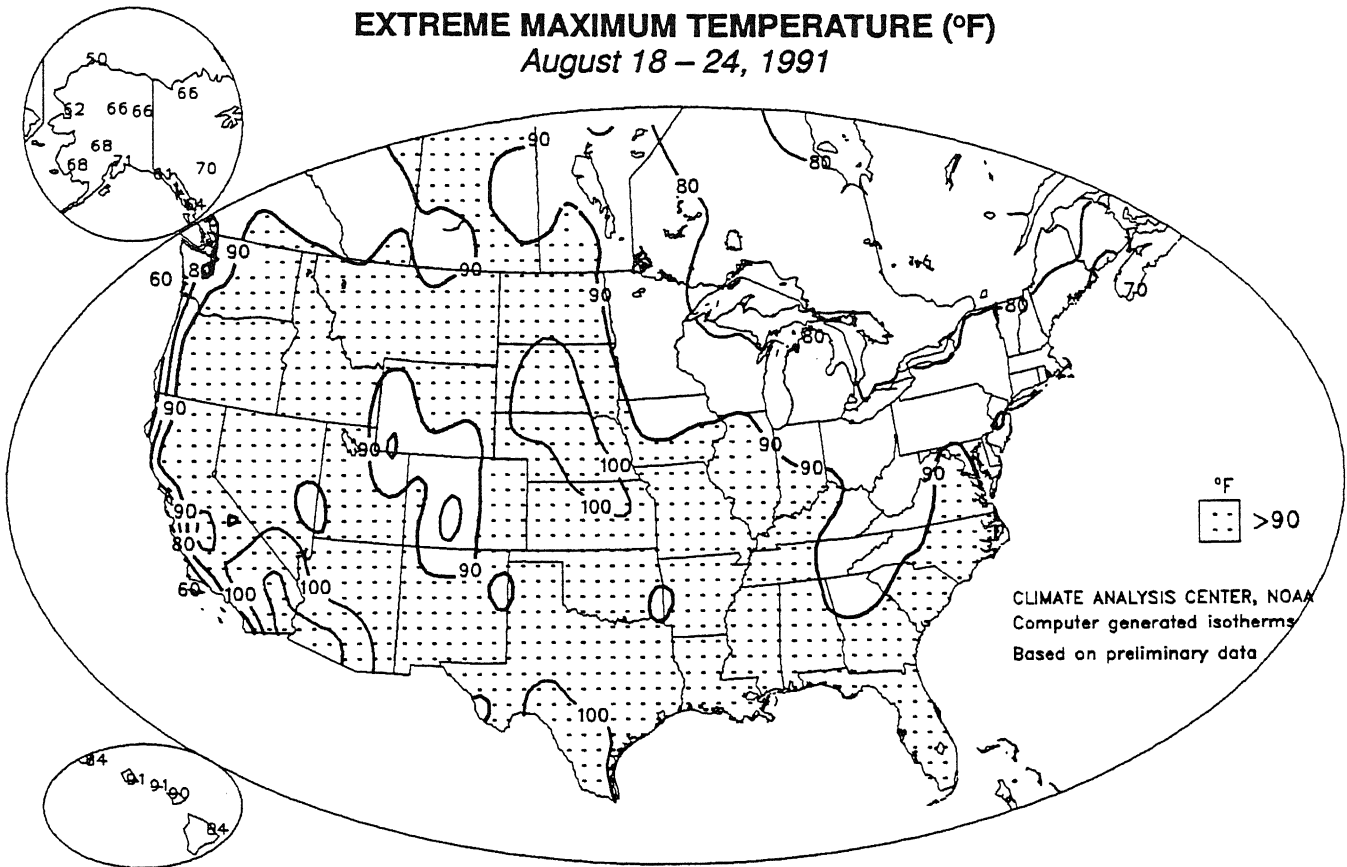


FIGURE 1. Total Precipitation Across the Northeast and Along the Mid-Atlantic Coast, August 18 – 24, 1991. *Isohyets are drawn only for 1, 2, 4, and 6 inches. Stippled areas measured 4 or more inches. Hurricane Bob spread heavy rain through the northern mid-Atlantic coast and across New England during the first part of the week. As the weekend approached, a low pressure system trekked along the north Atlantic coast, causing additional heavy rain and localized flooding. Up to 9.1 inches was reported in southern Maine, where daily totals during Hurricane Bob reached 6.5 inches. Further south, heavy rains of 2 – 4 inches in the Susquehanna River Valley provided beneficial moisture from the long-term dryness that has afflicted the region.*

EXTREME MAXIMUM TEMPERATURE (°F)

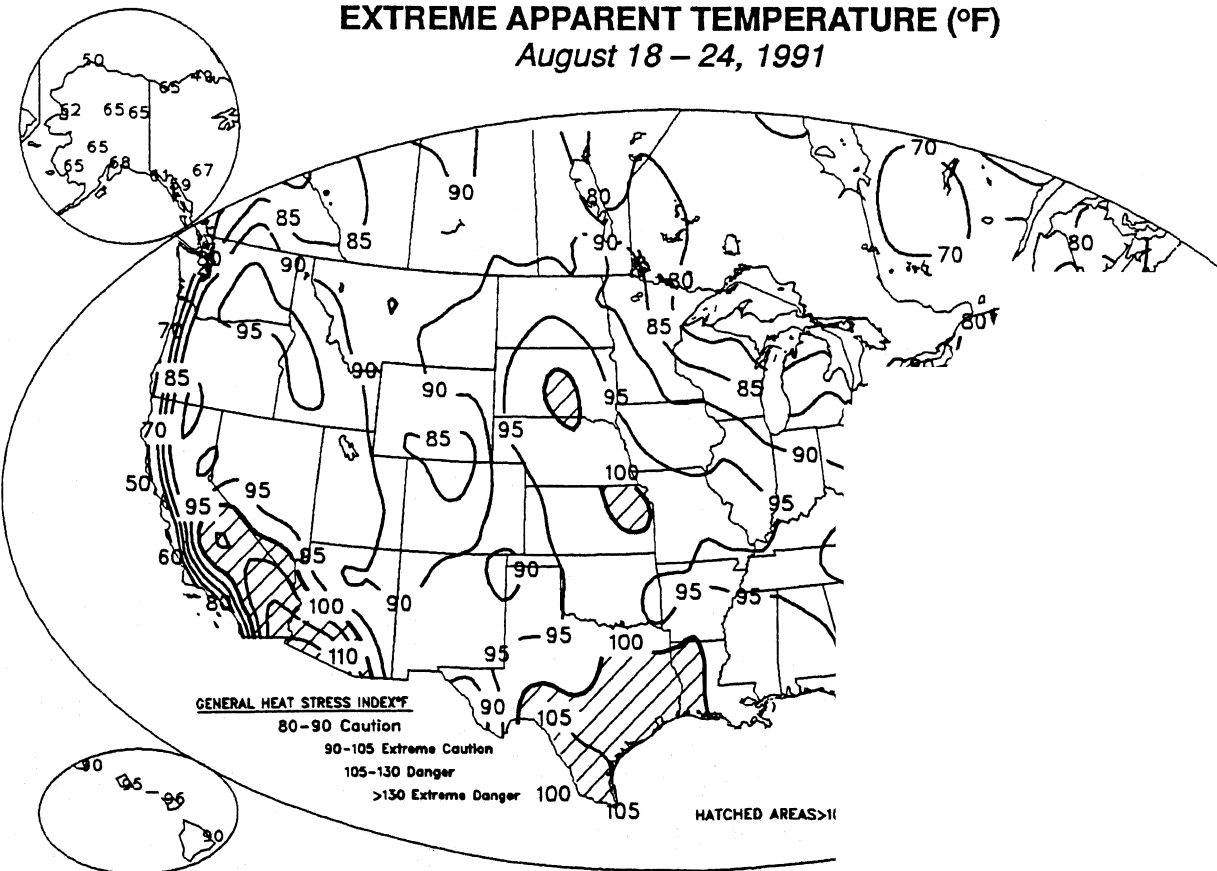
August 18 – 24, 1991



Hot weather returned to the northern and central Plains as temperatures soared above 100°F at week's end. Triple digit temperatures were also observed in the lower Rio Grande Valley and the desert Southwest (top). A combination of heat and humidity produced apparent temperatures greater than 100°F in southern Florida, southern Texas, western Louisiana, portions of the northern and central Plains, and from the desert Southwest to central California (bottom).

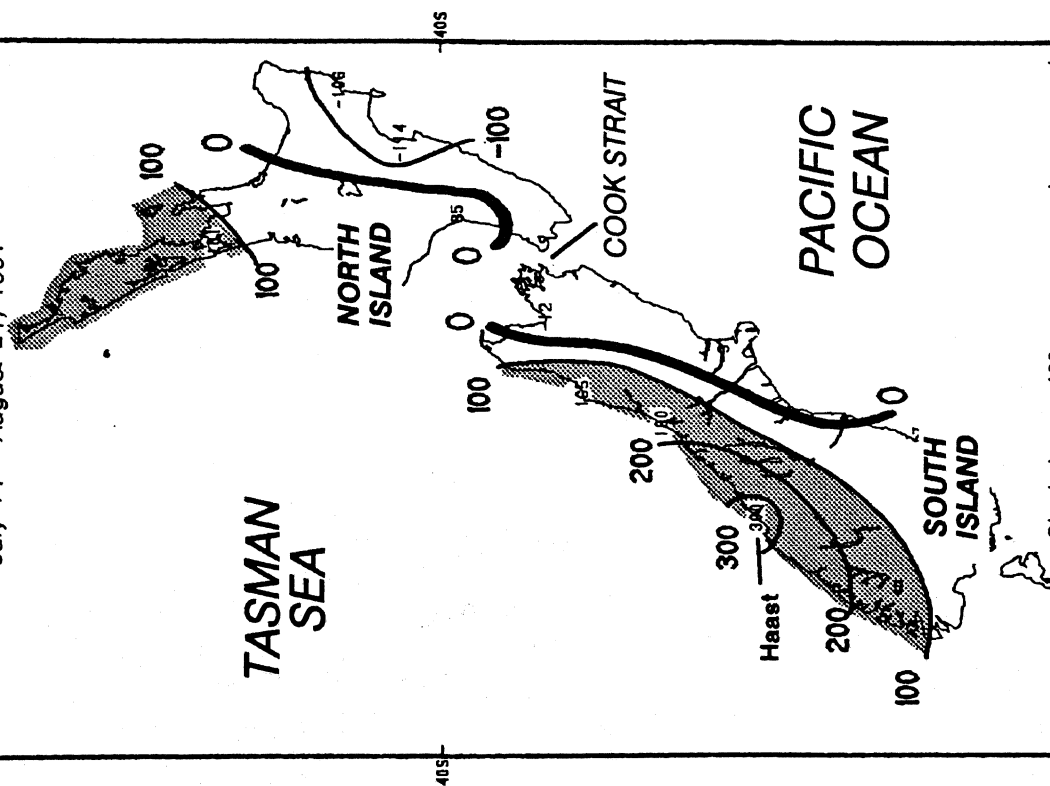
EXTREME APPARENT TEMPERATURE (°F)

August 18 – 24, 1991



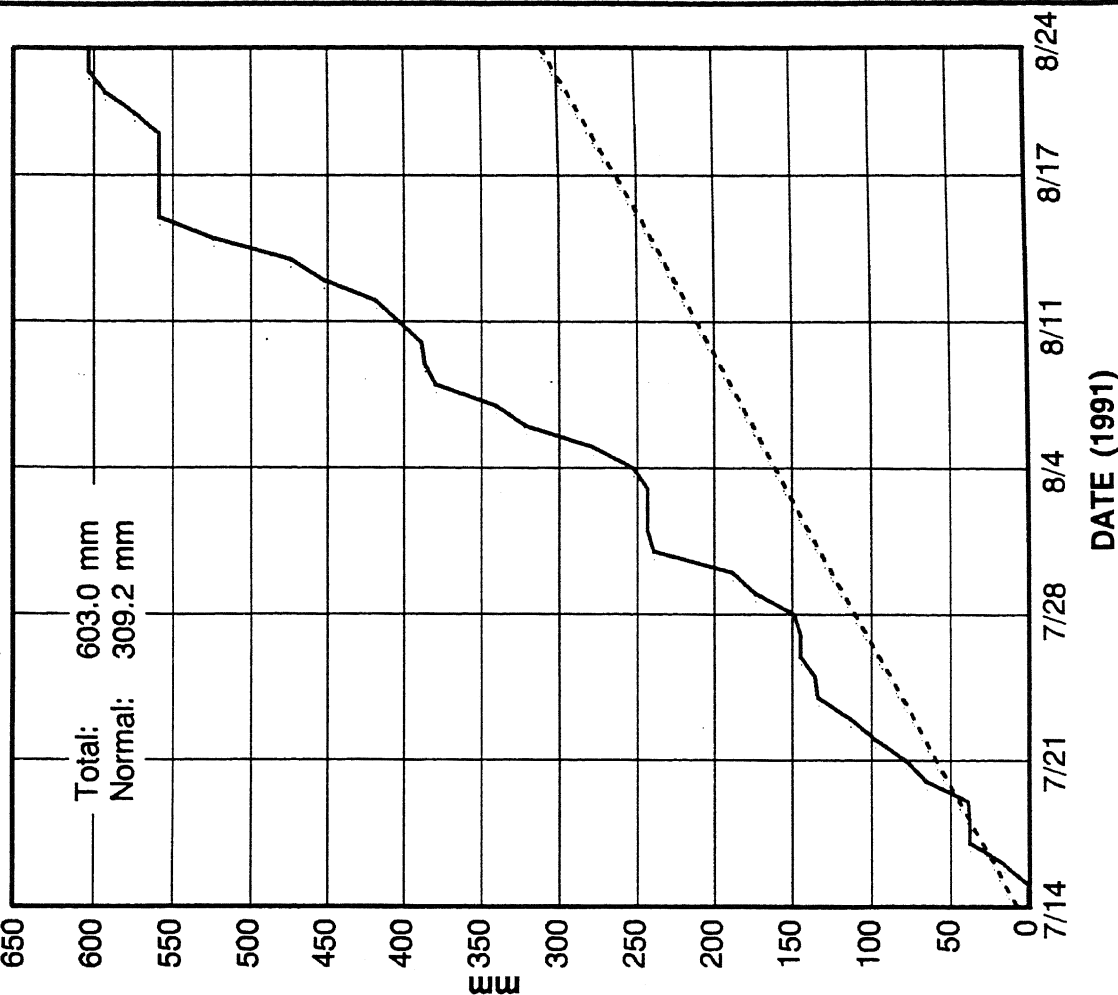
GLOBAL CLIMATE HIGHLIGHTS FEATURE

DEPARTURE FROM NORMAL TOTAL PRECIPITATION
ACROSS NEW ZEALAND
July 14 - August 24, 1991



Shaded areas 100 mm or more above normal
At least 34 daily reports (80%) were necessary for inclusion

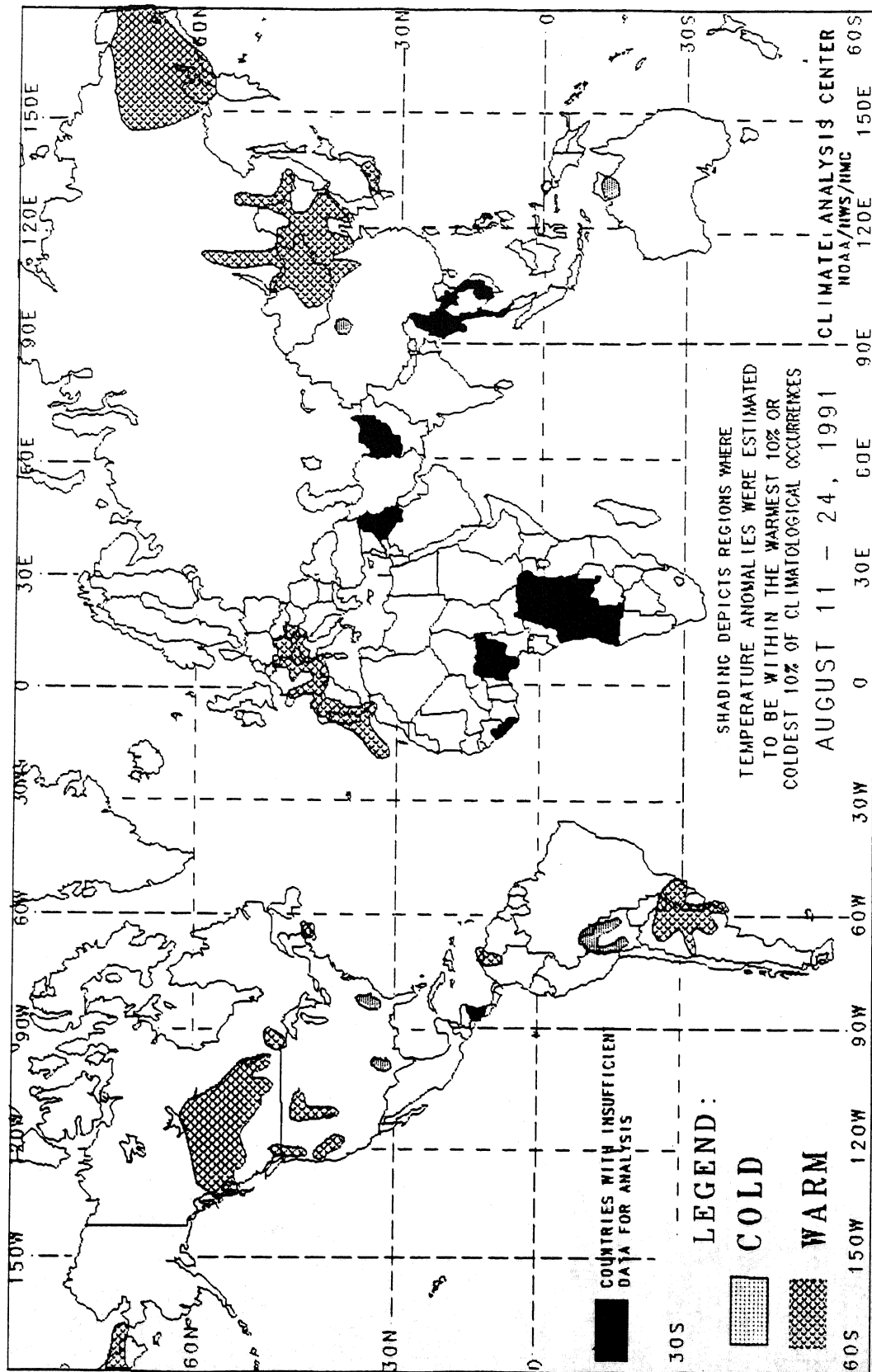
CUMULATIVE TOTAL (Solid Line) vs. NORMAL (Dashed Line) PRECIPITATION
Haast, New Zealand
July 14 - August 24, 1991



Exceptionally damp and dreary weather has plagued the western half of South Island and the North Cape of North Island, New Zealand during the last six weeks. Haast, along the west-central Tasman Sea coast on South Island, was one of the wettest locations, measuring nearly twice the normal precipitation during the period. Fortunately, flooding has not been a concern since large daily totals have not been reported; however, measurable precipitation was recorded on 32 of the aforementioned 42-day period in Haast, including 29 of the 32 days during July 16 - August 16, 1991.

2-WEEK GLOBAL TEMPERATURE ANOMALIES

AUGUST 11 - 24, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

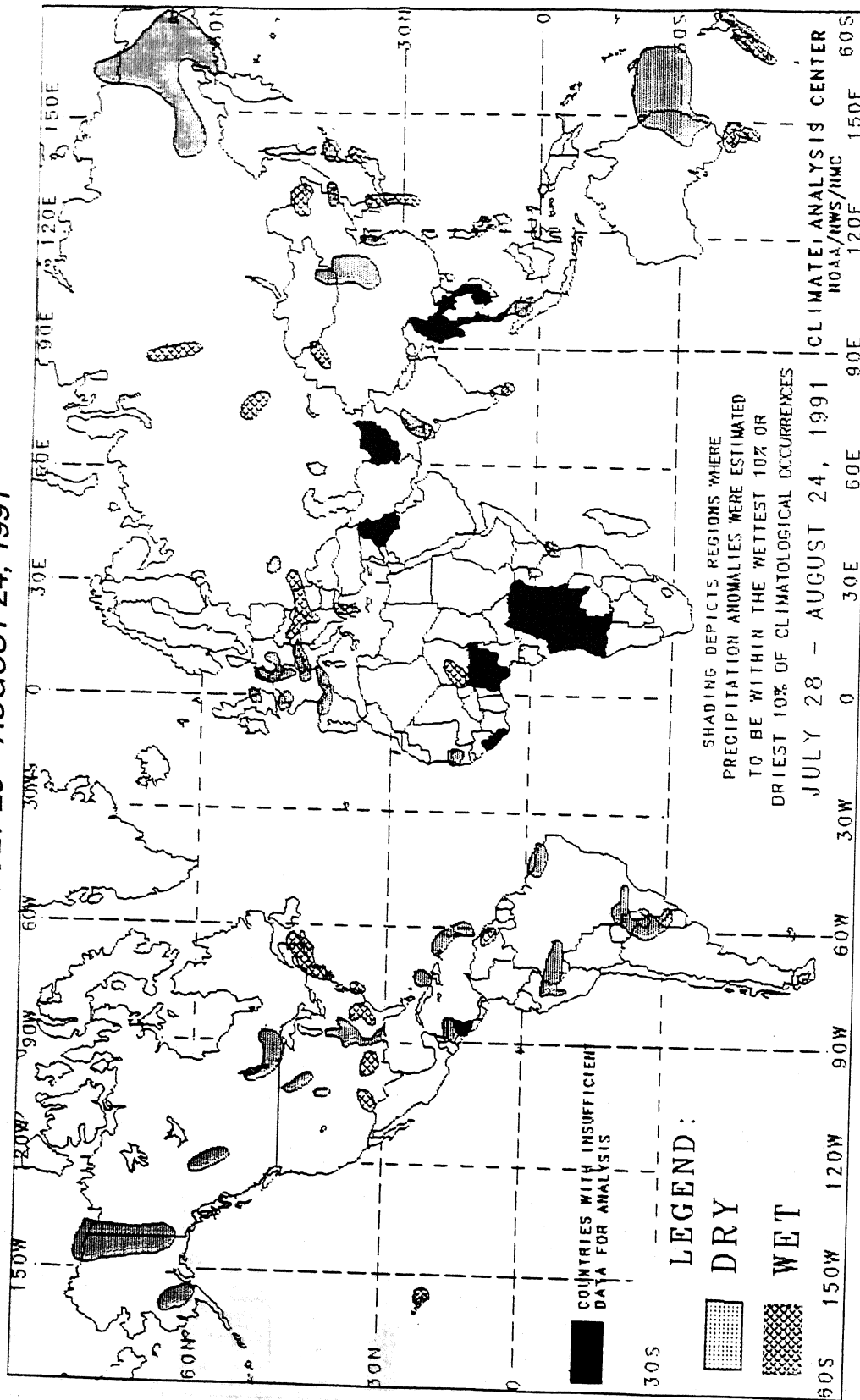
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

JULY 28 - AUGUST 24, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

